1. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, comprising:

a quench pipe manifold and nozzle assembly;

a collection tray having a manway and located below the quench pipe manifold and nozzle assembly for receiving fluid from a catalyst bed above the collection tray;

a mixing chamber located below the colletion tray and in fluid communication with the collection tray to receive two-phase fluid stream flowing therefrom; and

a final distributor tray for distributing fluid to a catalyst bed below the distributor tray, said distributor tray having a manway.

2. (Currently Amended) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim ~~1~~ 7, wherein the quench pipe manifold and nozzle assembly is an annular ring pipe manifold having nozzles arising therefrom, said nozzles having nozzle outlets located between catalyst support beams supporting the catalyst bed above the manifold and nozzle assembly and in which the direction of flow from outlets of said nozzles is parallel with said catalyst support beams.

3. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 2, wherein the annular ring pipe of the quench pipe manifold and nozzle assembly is located away from the centerline of the reactor.

4. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 2, wherein each quench gas nozzle is configured such that quench gas flowing therefrom has an exit velocity between fifteen and thirty-five feet per second.

5. (Currently Amended) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim ~~1~~ 2, wherein the collection tray has ramps extending therethrough for directing flow of a two-phase fluid stream from the collection tray into the mixing chamber below.

6. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 5, wherein the ramps through the collection tray have overhead chutes for directing vapor flow of the two-phase fluid stream from above into the mixing chamber below.

7. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 1, wherein the mixing chamber is an annular compartment depending from the collection tray above and having a partition pan and a bottom section pan,
said partition pan having a partition weir at its inside diameter over which liquid flows onto the bottom section pan, and

said bottom section pan having a vapor outlet weir at its inside diameter, which inside diameter is less than the inside diameter of the partition weir, for vapor flow onto the final distributor tray below and having drip tubes extending to the final distributor tray below, said drip tubes having top slots and bottom slots for directing liquid flow onto said final distributor tray.

8. (Currently Amended) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 7, wherein the drip tubes are located generally in a ring with a ~~radius~~ diameter of $1/\sqrt{2}$ or 0.7071 times the inside ~~radius~~ diameter of the reactor.

9. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 1, wherein the final distributor tray has downcomer pipes to accomodate flow of the two-phase fluid stream to a catalyst bed below.

10. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 9, wherein the downcomer pipes from the final distributor tray have top slots and side orifices.

11. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 7, wherein the diameter of the vapor outlet weir is at least twenty-four inches.

12. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 11, wherein the diameter of the vapor outlet weir is at least thirty inches.

13. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 7, wherein the liquid residence time in the mixing chamber is at least one second.

14. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to claim 7, wherein a cylinder forms the outer circumference of the pans of the mixing chamber having a diameter of at least $1/\sqrt{2}$ or 0.7071 times the inside diameter of the reactor.

15. (Original) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, comprising:

a quench pipe manifold and nozzle assembly having an open center portion;

a collection tray having a central manway and located below the quench pipe manifold and nozzle assembly for receiving fluid from a catalyst bed above the collection tray;

a mixing chamber having an open central portion and located below the collection tray and in fluid communication with the collection tray to receive two-phase fluid flowing therefrom, said mixing chamber having an open central portion substantially aligned with the central manway in the

collection tray and large enough for a person to pass therethrough; and

a final distributor tray for distributing fluid to a catalyst bed below the distributor tray, said distributor tray having a central manway.

16. (New) A quench box for a multi-bed, mixed-phase cocurrent downflow fixed-bed reactor, according to Claim 7, wherein the mixing chamber has an open central portion substantially aligned with the central manway in the collection tray and large enough for a person to pass therethrough, and wherein the final distributor tray manway is a central manway.